CONSTRUCTION OF HAPPINESS INDICES: A WAY TO EXPLAIN SUBJECTIVITY OF HAPPINESS

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ABSTRACT
Economists have learned not to quantify utility in a direct way, rather to confirm it from behavioural manifestation and that manifestation based on what one perceived from his/her life circumstances. The attitudes of individuals indicate whether they are happy with what they have, for example, with their lives and families. But to interpret happiness in one word or through one phrase can make it more ambiguous. So, in this study we have included several variables that contribute one's overall level of happiness that was not being included in the previous studies. The happiness constructed in this study through principal component analysis for further empirical analysis. The economics of happiness is one of the emerging areas that not only thriving into economic policy but also for socio economic policies. In this analysis we have explored maximum possible variable that may contribute to one's happiness not at individual's levels but also at country's level. From these variables we have constructed ten happiness indices: family happiness, neighbour happiness, environmental happiness, gender happiness, patriotism happiness, political happiness, religious happiness, life satisfaction and freedom of choice happiness.
Key words: Happiness, economic policy, principal component analysis, variables.

INTRODUCTION
Everyone has several goals during one's life span, but the ultimate goal of life is happiness, as numerous authors argue (Frey & Stutzer, 2002). Undeniably, each one of us is in the pursuit of happiness. In economics, income is looked at as a suitable proxy for human welfare, although it is an incomplete proxy for eternity. Over time, the research on happiness claims that reported subjective wellbeing is a fitter measure instead of income for welfare. In psychology, individuals evaluate the degree of their experience that affects them positively or negatively. Psychologists, therefore, use a scientific term for explaining happiness. They call it: "Reported subjective wellbeing." There is a process to evaluate the extent to which one experiences ups and downs in one's life that affect happiness either directly or indirectly. The happiness, life satisfaction and subjective wellbeing are constructs that are used separately and connote precisely. But generally, these terminologies, such as life satisfaction, happiness and wellbeing are used equivalently in the literature (Frey, 2008; Easterlin, 2001).

The Economists believe that economic well-being has a serious impact on happiness. the widely accepted idea that "more is better than less" is based on revealed preference represented in terms of utility. A key conclusion of this theory is that raising one's income can improve wellbeing, and that societal policies that raise incomes generally result in improved wellbeing. Although economists are aware that there are many factors besides material conditions that affect happiness, they have long assumed that if income increases significantly, then overall wellbeing will also move in the same direction, as if income were the most important factor in determining happiness. Various economists claim that normal persons have a utility or happiness function in which their level of enjoyment is dependent on different monetary and non-monetary factors.

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Theaverage individual is said to have a set of objectives, or aspirations, and a level of achievement in each area. The gap between one's goals and accomplishments in each area, as well as the relative weight each area has in one's utility function, determine one's overall level of satisfaction (Easterlin; 2003).

Economists have discovered that utility is best inferred from behaviour rather than directly measured. A group of Dutch economists who defied the trend by repeatedly asking individuals about their contentment with their material well-being is an exception to this tendency (Easterlin, 2003; Headey *et al*. 2004).

Economists have started paying attention to the psychological literature and started to focus that how SWB is affected by income, inflation, unemployment, and institutional functioning just during last two decades. These were psychological theories and findings that pushed economists to focus on the psychological research and its results regarding SWB, as SWB throw light on the preference approach. The approach assumes that preferences by people are extrinsically decisive about their selection of their choices. So, if the preferences are extrinsically decided then it can be concluded that a raise in supply of goods and services will enhance their utility. On the other hand, a contrary theory suggests that preferences are majorly intrinsic, that means that people mend their preferences regarding the wants of the other people. If it really in the same way then we cannot assume that abundance of goods and utilities will result in more utilization of goods and services at time t+1 (Headey, *et al,* 2004). An economy where a person has everything available to consume, and rest suffer from scarcity is efficient (Varian, 1992) i.e., that means one must hurt others to stay happy. The organizational structure of a nation and welfare of its people are not mutually exclusive but are instead interdependent (Frey, & Stutzer, 2002). The wealth alone does not explain changes in peoples' wellbeing and hence their happiness (Bruni, 2004). It turned to be false that increasing a nation's output or productivity will improve people's moods. Even in the western countries where real income of people has been increasing for a span of time there was no raise in the SWB of people (Oswald, 1997).

Gap

Therefore, findings of research in happiness provide a new avenue for human knowledge and that put a benchmark in the field of economics. Its first implication about happiness leads us away from concentrating on GDP that measures everything except that which makes life worthwhile Kennedy (1968). A second implication is that the data pertaining to happiness has changed the focus of policy; it allows decision makers to develop a factual analysis regarding cost and benefit, being sure about what really what is significant to people. Finally, happiness research on happiness is almost like revolutionizing social and economic policies,' as mentioned by Oswald (Brookings Institution, 2004). It is considered a new strategy for development that tackles social as well as economic aspects and is used for informing policymakers. Currently the local bodies, institutions, socialists, economists, and finally societies are focusing on the survey's data for the measurement of happiness.

There are a number of words which usually substitute the word happiness, such as mood, attitude, behaviour and fortune etc. Simply, happiness refers to certain feelings and emotions that are experienced by someone in his/her life. The concept of happiness is also explained by behaviours of individuals as, for example, when we say that a person is happily married, it means that someone is cherished with his/her married life. The attitudes of individuals indicate whether they are happy with what they have, for example, with their lives and families. In this sense, happiness indicates contentment and satisfaction with what people have. But to interpret happiness in one word or through one phrase can make it more ambiguous.

There is a need, therefore, to explain happiness in a broader way. It is not one time phenomenon which expresses feelings and moods of respondents. In this analysis of happiness, we considered a series of questions from *WVS* for the 56 countries of the world based on data availability. We have divided countries into three major groups: high, middle, and low income based on *World Bank* definition. The study amalgamates the low middle income and low-income groups because individually the two groups are too small for the purpose of analysis in the present context.

Historical Measurements of Happiness

In comparison of economists' psychologists have been more concerned about the level of happiness and its measures. For many decades they spend time to know the details of those factors that affect life satisfaction considerably (Argyle, 1989; Diener *et al*., 1999, Fox, & Kahneman; 1992, Myers, 1992, Diener, & Suh, 2000). According to them SWB or level of happiness is viewed as perception individuals about the degree of favourability for the whole life or any specific dominion of life. Publicly

such types of behaviour are inaccessible to observe, so partially it can be observed by asking straight questions about their feelings according to psychologists. But importantly then how can be SWB captured? Simple and comprehensive method to measure an individual's SWB by surveys. These surveys may design on single or multiple item questions depending upon the objective function of state of being happy.

Methods for Measuring of Happiness

Measuring happiness is well thought-out instrument for policymakers once designing policies regarding public. In next section, we explained five global renowned approaches that measure happiness.

    1. Asking People Global Evaluations of Individual Life Satisfaction (survey method)

    2. Experience Sampling Method (*ESM*)

    3. Day Reconstruction Method (DRM)

    4. The U-Index

    5. Brain Imaging

Measurement of Happiness in Practice by Economists

There are three main methods which are in practice for the measurement of happiness under surveys methods which are explained as under.

Happiness Planet Index (HPI)

This index has been introduced by *New Economic Foundation (NEF).* The HPI is a leading global sustainable happiness measure. It is supposed to what services various countries provide to their people to improve their lives in terms of longevity, happiness and how sustainable these services are. The index uses global data on experienced wellbeing, life expectancy and ecological footprint, as explained below to calculate the HPI. It is a standard that measures and ranks the countries on the standards the countries have provided to their people and the improvements they have made.

Gross National Happiness (GNH)

The government began to focus its national strategy and development plan towards GNH after the country's fourth king announced in 1972 that GNH was more significant that GNP. It is critical to make it clear that GNH in Bhutan differs from Western literature on happiness in two ways: first, it is multidimensional and does not exclusively focus on one dimension of happiness at the expense of other dimensions, and second, it explicitly internalises accountability and motivations.

Merits and Demerits of the Measures of happiness and Data Limitations

In experience sampling method (ESM) the data are collected from the representative individual by asking immediate questions with the use of beeper and handheld computers. So, in comparison to simple surveys *ESM* is much expensive, therefor it not in practices more commonly (Frey & Stutzer, 2006).

    The day reconstruction method (DRM) is cramped single question only. *DRM* is more sophisticated way to measure happiness by tempting respondent refined to think cautiously about their feelings of happiness on a daily basis during each time period. Despite its nature of precision and refinement, the *DRM* is not in use commonly and still considered as a new technique (Frey & Stutzer, 2006).

    The U-Index method is used to avoid the cardinality concern (Kahneman and Krueger, 2006), which is based on the dominant emotional state of most of the people who rely on negative emotions in the entire episode. The whole methodology moves around positive and negative episodes. "It means the occurrence of negative feelings in any episode is a significant occurrence" (Frey & Stutzer, 2006). So, the U-Index ignoring positive episodes while mapping correspondence feelings of any respondent, therefore, it depends mainly on unpleasant episodes.

    The brain imaging method is most proficient method for the determination of one being state of happiness than any other survey technique. The fact needs to be noted that it is not commonly used for being expensive not easy to apply it on a large scale (Frey & Stutzer, 2006).

    The *HPI* is criticized just because of researcher false understanding regarding measurement of happiness. It just measures the ecological efficiency that can only support wellbeing. We know that *HPI* consists of three variables, but rest of important variables are like family ties, political concerns, economic freedom, ethnic rules, institutional quality are for off this calculation. Most of the data of this index takes from other sources. In general, *SWB* and ecological footprint are confrontational ideas to calculate level of happiness by many critics. As life satisfaction or level of happiness are subjective in nature: persona, social and public policies also impact happiness that should be included in the calculation of happiness. HPI is not much clear that whether it measures of happiness or efficiency of

environment efficiency in a given country[†]. The GNH methodology is only used for Bhutan on the basis of five-year plan strategies for happiness. Although it covers all the domains with 33 indicators that are having equal weight, but it is still practiced only in Bhutan.

The above discussion provides us solid ground to construct our own happiness data as the above methodologies either are too lengthy in practice or too limited to in span. We want to large data set and make some deeper analysis for maximum available variables. The detailed PCA methodology, selection of data set and how it's constructed is discussed in ensuing sections.

DATA AND METHODOLOGY

Everyone is in search of happiness and failure of finding it can cause all kinds of frustrations and other serious psychological issues. Pre-eminently, it is too tricky even to define happiness: is it having what you want or wanting what you have? It is obvious that the correlations between one's own possession and having desire for possession do not spawn the same levels of happiness. To define happiness or to generate happiness variable, we used the dataset of World Value Survey (*WVS*). Here we have explained the whole data set of *WVS* comprehensively.

The *WVS* is an international research project that investigates peoples' values and convictions and what changes occur over time in them. *WVS* also captures those impacts of social and political nature that occur in response to these changes. This is a worldwide survey that covers roughly 100 countries of the world and has been conducted by social scientist since 1981. It is the only source of empirical data on attitudes that covers 90% of the world's population. This survey measures broad topics about life perception, culture and values, family, occupation, economic well-being, religious and moral standards, the economy, politics and society, the environment, allocation of resources, contemporary social issues, national identity, and technology and its impact on society. It also scrutinizes the areas like support for democracy and gender equality, tolerance of foreigners and ethnic minorities, national identity, importance of religion and degree of religiosity, the impact of globalization, attitudes toward quality of environment, choices for work, personal and social life, the role of politics, marriage, single parenting, child-rearing, diversity in culture, insecurity, and SWB. Specifically, the justifications of social evils ask from respondents whether and to what extent the acts like suicide, cheating on taxes, euthanasia, divorce, and abortion (see Table 1.9) are justifiable.

The findings of *WVS* are not only valuable for policymakers, but also for researchers and students for future perspectives seeking to build a civil society and democratic institutions, especially in developing countries. The work is also frequently used by governments around the world, and the international organizations and institutions such as the *World Bank* and the *United Nations*. The waves of this survey capture the intergenerational changes that are taking place in basic values to politics, economics and social life, religious beliefs, gender differences, ethnic values and family norms. These values are different for all generations in all societies due to economic growth taking place. To examine the consistency among these changes, the second 1990–94 and third wave 1995–98 of *WVS* were carried out. A fourth wave was carried out in 1999–2004 in 65 countries. A key goal was to obtain better coverage of African and Islamic countries, which had been ignored in previous surveys. The most recent waves are the fifth, sixth and seventh that were carried out in 2005–09, 2010-2014 and 2017-2020 respectively.

The above discussions about *WVS* provide a solid ground to use these data for the construction of happiness indices. We have included the three waves (1999–2004, 2005–09, and 2010-2014) of *WVS* in this analysis and last wave of *WVS* would not include in this analysis.

The reason of not having this recent wave in this paper is that it has some definitional changes in its variables over the time. So, to match the frequency and relevance of the variables we have first explored the three waves. Furthermore, the dimension of happiness that has studied in this analysis did not explore earlier. So, we have selected the questions according to the meaning of happiness. These questions cover the entire aspects of one's life satisfaction. These questions cover personal relations, choice of work, moral values, financial problems, religion and morals, the economy, politics and society, the environment, national identity, and societal issues. It also discusses how we have divided sub-indices of happiness and the countries grouping on the basis of income level. We explained the methodology for the construction of happiness indices, *i.e.,* principal component analysis *(PCA).* It also

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[†] Source: Wikipedia

explains how the construction of happiness indices is carried out. We elaborate the happiness indices in the context of income groups (low, middle, and high incomes).

METHODOLOGY

Index is a statistical measure of data that combines a set of variables of similar nature into a single variable. The index may represent the phenomenon such as stock market performance, prices, productivity, employment, etc. Economic situations are tracked by economic indices from different perceptions. The Consumer Price Index captures the trend in prices for a basket of consumer goods and services over time in certain geographic areas. Similarly for any labour market the job index explains the labour market conditions and a stock market index shows investors' and other agents' sentiments about the corresponding stock market.

PCA is one the statistical methods which can be used in the construction of indices. PCA is a multivariate statistical method of reducing large data set by applying covariance analysis between the factors. It is best fitted for data set of multiple dimensions and reduces these data into a smaller number of dimensions. The PCA was introduced by Pearson (1901), but it is often endorsed to Hotelling (1933). Its use is appropriate when we want to convert a large number of variables into a manageably small number of artificial variables, called the principal components. A limited number of principal components can encompass most of the variation in the observed variable. This method is appropriate when we have large data for multiple variables and need some sack in these variables. In large dataset, most of the variables are correlated with each other and tend to explain the same phenomenon. So, redundancy reduces the pragmatic variables into artificial variables i.e., principal components, which explain the maximum variations in data. It means that PCA is a technique in which we reduce our data into useful form and also make the collected data relevant for statistical analysis. The resulting principal components may then be used for subsequent analyses. PCA is computationally easy and also avoids many of the problems associated with the traditional methods, such as linear aggregation, standardization, and nonlinear relationships of variables affecting socioeconomic inequalities (Vyas & Kumaranayake, 2006).

Technically, we say principal component is the linear combination of optimally weighted observed variables. Now for further measures, first, we explain how these weights on principal component are computed.

1. The PCA converts correlated components into uncorrelated components and indices. The prime objective of principal component analysis is the construction of a set of variables into new variables called principal components i.e., $Y_j (j = 1, 2, ..., k)$. Each new variable is a linear weighted combination of the original variables, that is,

$$P_1 = a_{11}Y_1 + a_{12}Y_2 + ..., + a_{1k}Y_k \quad .... (1.1)$$

$$P_2 = a_{21}Y_1 + a_{22}Y_2 + ..., + a_{2k}Y_k \quad .... (1.2)$$

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$$.$$

$$P_k = a_{k1}Y_1 + a_{k2}Y_2 + ..., + a_{kk}Y_k \quad ....$$

(1k)

where P's are values on principal components from 1......k, a's are the regression coefficient (weights) for observed variable k which is used in the construction of principal component, and Y's are the values of observed variable k. The weights or loadings of principal components are given by eigenvectors of the correlation matrix. These weights are also taken from covariance matrix if the original data are standardized.

2. The method of PCA can be applied by using values of $Y_j's$ in deviation form, that is, $y_j = Y_j - \bar{Y}_j$ (deviation from means) or by standardized variables $Z_j = {}^{y_j}/_{s_{yj}}$, which are measured as the deviation of $Y_j's$ from the respective means divided by the standard deviations. The values of principal component will be different depending upon the

way the variables are used (original/deviation/standardized values). The principal components capture different sources of variations in the data set. The first principal component P_1 captures the largest possible variations in the original data having the constraint that the sum of squared of loadings is equal to unity. The second principal component P_2 is completely uncorrelated with P_1 and explains the maximum additional variations in the data but these variations are small in comparison to those computed by the first component. The third component accounts for the maximum that the first and the second do not account for and so on. Thus, the subsequent components are mutually uncorrelated and capture smaller but additional variations. So, the fewer components are needed if the correlation among the original data is high.

3. There are three important conditions of loading factors that are satisfied by each principal component.

i. There is no correlation between the main elements.

ii. The first primary element takes in and accounts for the greatest percentage of all variants in the set of all Ys. In the same way, the second primary element absorbs most of the rest of the variations in the Ys and so on for number of primary elements.

iii. First, one must compute coefficients (a's) from equations 1.1 to1.k, then perform some tests of significance to confirm that the computed coefficients are statistically significant or not. On the basis of proportion explained by the eigenvalues, one decides as to how many of the principal components (out of possible) be retain for further analysis.

Computation of Coefficients (a's)

The method of finding loadings has been developed by C.Burt. The method may proceed in the following steps.

   I.   We start with simple correlation coefficients between k explanatory variables. These correlation coefficients may be arranged in a table which is known as correlation table. The main diagonal comprises units in which each X_i ($r_{x_i x_i} = 1\, for\ all\ i's$)is self correlated. This correlation matrix is in symmetry means the elements of each row are identical to the element of each corresponding column.

$$r_{x_i x_j} = r_{x_j x_i}$$

   II.   In the next step we sum up each row or column of the correlation table and obtaining the k sums of simple correlation coefficients.

$$\sum_j^k r_{x_i x_j} = \sum_i^k r_{x_i x_j}$$

   III.   Now we compute the sum total of the row (column) sums and take its square root.

$$\sum_i^k \sum_j^k r_{x_i x_j}$$

   IV.   Finally, we find the loadings ($\hat{a}_{ij}'s$) for the first principal component P_1 by dividing each column (row) sum by the square root of the grand total;

$$a_{1j} = \left(\sum_j^k r_{x_i x_j}\right) \Big/ \sqrt{\sum_i^k \sum_j^k r_{x_i x_j}}$$

Where i refers to the ith value of variable X. It must be clear that the loadings are in effect a form of correlation coefficient. Now this factor is denoted by l_i .

   V.   The sum of squares of the loadings of each principal component is called the latent root (Eigen value/ characteristics root) of this component. It will be denoted by λ having subscript relating to the principal component which is under the concern. The latent root of first principal component. The latent root of each principal component is the

sum of the squares of the loadings. It will be indicated by a subscript referring to primary component which is the subject of concern. The first main component's latent root in our analysis is λ_1 which is showing the variance of each corresponding eigenvector i.e.

$$\lambda_1 = [latent\ root] = \sum_i^k l_i^2 = l_1^2 + l_2^2 + \cdots + l_k^2$$

$$\sum_i^k a_{1i}^2 = l_{11}^2 + l_{12}^2 + \cdots + a_{1k}^2$$

$$\boldsymbol{\lambda_m = \left[latent\ root\ of\ the\ m^{th}\ principal\ component\right] = \sum_i^k l_{mi}^2}$$

The above equation shows the general form of latent root or characteristics values here "m" refers to the order of construction of the principal component. The sum of the latent roots of all the principal components is equal to the number of X's i.e

$$\sum_i^k \boldsymbol{\lambda_i = k}$$

The latent root of any Z_i provides an indication about the importance of Z_i. It is the amount of the total variation that a particular Z_i has extracted from the set of the X's. In fact, the latent root is the actual variation extracted by the Z_i^{th} principal component. More convenient way is to express latent roots in the form of percentage of the total variation in the set of X's. The percentage contribution of P_i in the total variance of standardized X's by using correlation table is;

$$\boldsymbol{[percentage\ variance\ accounted\ by\ P_m] = \frac{\lambda_m}{k} * 100 = \frac{\sum_i^k l_{mi}^2}{k} * 100}$$

The first principal component P_1 has higher latent root than second and the second principal P_2 has a higher latent root than the third and so on. So, the value of latent roots become smaller and smaller for subsequent P's because the principal component procedure extracts the maximum possible variance for each P in turn.

RESULTS AND DISCUSSION

In family happiness we have included nine aspects of child qualities as children are the major component of family ties and happiness. In developed countries, children are physically abused by their caregivers. This frequent abuse leads to sever maltreatment for many children. According to Carter (2005) about 1·3 million children (aged 0–17 years) are in social-care facilities within 20 countries in Eastern Europe and the former Soviet Union and by Hunt (1998) they are physically and sexually abused by caregivers and peers in those institutions commonly. According to Gilbert, *et al.* (2009); maltreatment contributes to the children's mental health, drug, and alcohol usage, justifying criminal acts from infancy to youth. In long terms, the negligence of parents turns out to be highly damaging physically, socially, psychologically, and sexually. The high-income countries need to pay attention towards the investment in precautionary and remedial strategies from early childhood to reduce the high burden child mistreatment. Secondly in this index we have included those questions which strengthen parent-children relationship. Parents' characteristics, such as their educational levels, financial status and mental health affect the maltreatment of children often in high income countries. The parental risk factors can be modified by environment and community in the realms of income, education, socioeconomic inequalities, and socio demographic characteristics in order to protect children from maltreatment (Berger, 2002, 2005, Ards, *et al.*, 2001, and Sidebotham, 2001). Moreover, poor economic circumstances affect the quality of child-care programs negatively. This leads to health problems and social discrimination, which may diminish the ability of an individual to earn income (Fotso and Kuate-defo, 2005, and Reed, *et al.*, 1996).

Table No. 1 Family Happiness

Sr#	Questions	Responses
1	Family importance	1 = very important, 2 = important, 3 = not important at all
2,3….10	Child qualities: 9 aspects of qualities	-1= don't know, 0 = not mentioned, 1= important
11	To make my parents proud of me	-1= no idea, 1= completely agree, 2 = concur , 3 = disagree
12	Parenthood important for every child	-1= don't know, 0 = partially disagree, 1= partially agree
13	Country or region	Country codes

The eigenvalues of family happiness show that the 1st PC (principal component) accounts for 27.6% of the total variation, second PC accounts for 22% and third PC accounts for 14% and other remaining PC's explain negligible variations. Therefore, on the basis of highest variations explain by 1st PC, we use 1st component for the construction of family happiness index as follow;

$$FHI^{\ddagger} = 0.0075X1 - 0.2794X2 + 0.168X3 - 0.3518X - 0.0061X5 - 0.0051X6 - 0.2092X7 - 0.0584X8 + 0.4367X9 + 0.1789X10 + 0.4888X11 + 0.4888X12 + 0.1499X13$$

The weights attached with variables of family happiness are normalized and their sum is equal to unity. The X's are the family happiness variables as discussed in table 1.1. The questions that relates to happiness of individuals with respect to neighbours are included as mentioned in Table 1.2.

Table No. 2 Neighbourhood

Sr#	Questions	Responses
1	Neighbors: people of different races	-1= don't know,
2	Neighbors: immigrants or foreign workers	0 = not cited, 1= cited

Competitive environment always affects the happiness of native as well as immigrants. Racial segregation may cause social inconvenience among different races. Myrdal (1944) worked on racial relations and authored "*An American Dilemma*" in which he claimed that racial segregation reduces the quality of public services to blacks without hurting whites. According to Massey and Denton (1998), the residential segregation has been an instrument in creating a structural role. An increase in geographic concentration of deprivation and also the deterioration of socio-economic conditions in black communities in the USA occurred on the face of extreme segregation. Such racial isolation under harsh environment evolves attitudes, behaviours, and practices that may affect other life aspects too. Racial segregation practices force the black citizen of the USA to live in ghettos, remain as marginalized neighbourhoods and undermine their chances of success in the mainstream American society. A ghetto is the highly under-developed part of a city in which members of a minority group live, especially because of social, legal, or economic pressures.

The eigenvalues of happiness that depends upon neighbour show that the 1st PC (principal component) accounts for 57.2 % of the total variation, second PC accounts for 42.8% of total variations. Therefore, on the basis of highest variations explain by 1st PC, we use 1st principal component for the construction of neighbour happiness index as follow;

$$NH^{\S} = 0.5X1 + 0.49X2$$

The weights attached with variables of family happiness are normalized and their sum is equal to unity. The X's are the neighbours' happiness variables as discussed in table 2.

The markets have had their own approaches based on the assumption of large number of resources and disregard for the environmental impact in the past. But resource degradation warrants re-examining both the theory and the practices of the past. The limited resources and high environmental

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‡ Family happiness index
§ Neighbor happiness index

costs shatter the assumptions of the past that there is a zero environmental cost and that the resources will always remain available in sufficient quantity. The human population and economic growth go hand in hand, but their magnitude may differ. This growth exerts a pressure on natural system and the pattern of production, eventually disturbing consumption. So, the equilibrium points of demand- supply has become unstable.

Table No. 3 Environment Apprehensions

Sr#	Questions	Responses
1	Protecting environment versus economic growth	0 = don't know, 1 = protecting environment, 2 = economy growth and job creation, 3 = other answer
2	In favour of environmental taxes	-1 = don't know,1 = agree strongly, 2 = agree, 3 = disagree, 4 = strongly disagree

The eigen values of happiness regarding environment show that the 1st PC (principal component) accounts for 55.9% of the total variation, second PC accounts for 44.99% and third PC. Therefore, on the basis of highest variations explain by 1st PC, we use 1st component for the construction of environmental happiness index as follow;

$$EHI^{**} = 0.5X1 + 0.5X2$$

The weights attached with variables of environmental happiness are normalized and their sum is equal to unity. The X's are the environmental happiness variables as discussed in table 1.3. The first question in this environment index as mentioned in Table 1.3 is about trade-off between economic growth and environment. The environmental impacts which are generated by the utilization of natural resources are addressed in this analysis. The second question is based on the personal choices of respondents about the environmental tax, whether the respondents are willing to pay environmental tax to protect environment or not. There is, therefore, a need of tax reforms about the environment attunes also with green growth reforms. This trade-off between environment and economy relate to human welfare as any tax reforms enable us to not only enhance human wellbeing but also conserve natural resources. This will protect the environment from degradation too.

The Table 4 address responses of those questions which are based on gender difference happiness. These differences may cause injustice between gender and leads to unequal distribution of life opportunities among male and female.

Table No. 4 Gender Differences

Sr#	Questions	Responses
1	In periods of depression male have more job rights	-1 = don't know , 1= agree, 2 = neither, 3 = disagree
2	Women as a single parent	0 = disapprove, 1= approve, 2 = depends
3	Being a housewife is just fulfilling.	-1= don't know, 1 = agree strongly, 2 = agree, 3 = disagree, 4 = strongly disagree
4	Men are good political managers.	
5	Higher education is more important for men	

According to Stevenson and Wolfers (2008), there is a relative decline in female happiness, creating a gender gap in happiness. In the 1970s typically women reported higher subjective wellbeing than men. The overall lives of women in the USA have improved over the past 35 years; however, women's happiness has declined in absolute and relative terms as compared to men. The study observes that this paradox has been found across various datasets of industrialized countries in response of gender gap among different demographic groups. This gender gap is leads to lower subjective wellbeing of women than men because there are certain socio-economic factors that make women to be less happy. In most societies, preferences are made in such a way that men avail more opportunities of education and jobs. Men are considered as better political leaders and have more rights to have good economic status in comparison to females. According to Putnam (2000) there are a number of important macro trends that worsen females through decreased social cohesion. This decrease in social cohesion ends in depression. That is why females face the problem of anxiety and neuroticism (Twenge, 2000).

According to Bjørnskov, *et al.* (2007) there is a gender gap faced by females based on three dimensions of their lives: politics, economic empowerment, and social relations. The discrimination in

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[**] Environmental happiness index

politics has also affected individual happiness. Women report maximum happiness when less discriminatory policies are practiced in the society where they live. The gender equality, however, as a unitary phenomenon for happiness is not justifiable. There are a few other measures of gender inequality that are significantly related to well-being, while others do not affect happiness.

The eigenvalues of gender difference happiness show that the 1st PC (principal component) accounts for 71.4% of the total variation, second PC accounts for 17% and third PC accounts for 6.6% ,and other remaining PC's explain negligible variations. Therefore, on the basis of highest variations explain by 1st PC, we use 1st component for the construction of gender difference happiness index as follow;

$$GDI^{††} = 0.2238X1 + 0.1372X2 + 0.1863X3 + 0.2265X4 + 0.2260X5$$

The weights attached with variables of family happiness are normalized and their sum is equal to unity. The X's are the variables of happiness regarding gender differences as discussed in table 4.

Table 1.5: Patriotism and Nationalism

Sr#	Questions	Responses
1	Importance of politics in one's life	1 = most important, 2 = partially important, 3 = least important, 4 = not important
2	Be willing to fight for country.	-1 = don't know, 0 = no, 1 = yes, 2 = depends
3	How proud of your nationality	

The questions based on nationalism and patriotism in Table 1.5 explains the behaviour of individuals towards their nationality. Individuals are more motivated to work and fight for their homeland if they consider their homeland better place for living. Good governance promotes better standard of living with less insecurities. According to Ott (2010), a positive relationship between the quality of government and the average happiness in nations has been observed. This relationship, however, becomes bell shaped when there is inequality in happiness. A higher level of average happiness can be achieved with the improvement of the technical quality of government. It all depends on the performance of governments which strengthen its quality. A big government can enhance happiness only when its own governance quality is good. Ott (2010) also explains that when there is an improvement in technical quality of a government from its low level to high, initially this improvement leads to more inequality in happiness among individuals but later on this inequality reduces.

The eigenvalues of happiness that depends upon patriotism show that the 1st PC (principal component) accounts for 44% of the total variation, second PC accounts for 30.5% and third PC accounts for 25.5%. Therefore, on the basis of highest variations explain by 1st PC, we use 1st component for the construction of patriotism happiness index as follow;

$$PHI^{‡‡} = 0.7761X1 - 0.5718X2 + 0.7957X3$$

The weights attached with variables of patriotism happiness index are normalized and their sum is equal to unity. The X's are the variables of happiness regarding patriotism as discussed in table 5. While constructing happiness indices, the questions regarding political importance in one's life could not be ignored. There are many groups and subgroups in a population to generate their classification and categorization regarding political interests. These groups always show their association towards different political setups that positively or negatively affects their life and rest of society.

Table No. 6 Political Interest

Sr#	Questions	Responses
1	Interested in Politics	1 = very interested, 2 = somewhat interested, 3 = not very interested, 4 = not at all interested
2	Political actions: signing a petition	-1 = not known, 1 = have done, 2 = might be, 3 = not interested
3	Political action: active in boycotts.	-1 = not known, 1 = have done, 2 = might be, 3 = not interested
4	Political action: in favor of peaceful demonstrations	-1 = not known, 1 = have done, 2 = might be, 3 = not interested

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†† Gender difference happiness
‡‡ Patriotism happiness index

| 5 | Desirable position on political scale | 1= left, 2 = 2,…………..,10 = right |

The eigenvalues of political happiness show that the 1st PC (principal component) accounts for 52.8% of the total variation, second PC accounts for 21.5% and third PC accounts for 18.5% and other remaining PC's explain negligible variations. Therefore, on the basis of highest variations explain by 1st PC, we use 1st component for the construction of political happiness index as follow;

$$PIH^{§§} = -0.02810X1 + 0.31880X2 + 0.29255X3 + 0.30962X4 + 0.10712X5$$

The weights attached with variables of political happiness are normalized and their sum is equal to unity. The X's are the variables of happiness that depends upon political interests as discussed in table 1.6. Good governance is one of the important domains of Gross National Happiness (GNH). It supposedly ensures the happiness of individuals in given states. This index is just like that domain and the purpose of this index is to know the respondents' feelings and interests towards politics. To enhance the wellbeing of the nations, the quality of government is as important as its nature (democracy etc). In contrast to other indices of happiness, the governance focuses on all the sectors of the society. Consequently, all sectors of society affect the life of individuals, which comes forth through the cumulative efforts of government. The religiosity is one of the main components in one's life. We have included four questions related to religiosity in religious happiness index in Table 7.

Table No. 7 Religion Importance

Sr#	Questions	Responses
1	Thinking about essence and rationale of life	1= regularly, 2 = occasionally, 3 = seldom, 4 = never
2	Religion denomination	1= Aglipayan, 17 = Christians, 42 = Jews, 49 = Muslims
3	Attendance at religious services	1= more than once a week, 2 = once in a week, 3 = once in a month, 4 = on holiday only, 5 = a year, 6 = seldom, 7 = never
4	What is the importance of God in one's life	1 = not at all,………,10 = imperative

Snoep (2007) has made a cross countries comparison for the United States, Denmark and Netherlands and on the data of *World Values Survey* (2000) and found that there is no correlation between religiosity and happiness unlike that found for the USA. But Opfinger (2010) found a U-shaped relationship between happiness and religious beliefs. Countries tend to experience high level of happiness when religiosity is either at peak or bottom. The intermediate levels of religiosity lead to less happiness. The reason behind such relationship is the network effects. It means the degree of religiosity measures the happiness of individuals. The religious people are happier if they live in accordance with their religious beliefs in the society and in case of atheists, religion does not play an important role.

The same results were found by Gundlach and Opfinger (2011) that explain the situation of countries with average levels of religiosity, especially the ones that expirence less happiness. The dgree of religiosity is much important as people are happier in the countries in which the level of religiosity is either high or low. In the countries at medium level of religiosity people expirence less happiness. The religious people are more happy in the religious localities or where religion is least important, that is, the atheists live happily. These stunning findings suggest considering religious factors while constructing happiness index. So we have considered four important questions of religion which affects one's happiness in terms of religion.

The eigenvalues of religious happiness show that the 1st PC (principal component) accounts for 42.9% of the total variation, second PC accounts for 26.9% and third PC accounts for 22.2% and other remaining PC's explain negligible variations. Therefore, on the basis of highest variations explain by 1st PC, we use 1st component for the construction of religious happiness index as follow;

$$RHI^{***} = 0.4751X1 + 0.1687X2 + 0.5474X3 - 0.1913X4$$

The weights attached with variables of religious happiness are normalized and their sum is equal to unity. The X's are the variables of happiness that depends upon religious interests as discussed in table 7

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§§ Political happiness index
*** Religious happiness index

The overall life satisfaction is one of the essential indicators that are used to capture the true picture of one's level of happiness in a broader sense. Seven different aspects of ones life satisfaction are included in the construction of life satisfaction index. It is one of the major variables of happiness planet index (HPI) that have considered by New Economic Foundation (NEF). We have considered seven indicators that unswervingly relate to overall life satisfaction of individuals rather than taking single question like in HPI of NEF.

Table No. 8 Life Satisfaction

	Questions	Responses
1	Feeling of happiness	1 = much happy, 2 = quite happy 3 = least happy,4 = unhappy
2	How much satisfied with personal Life	1 = dissatisfied, 2 = very little dissatisfied,………., 10 = satisfied
3	Satisfaction with household's current financial situation	
4	How much freedom you feel	1 = not at all , 2= not much, ……., 10 = a great deal
5	Most people can be trusted	-1 = no idea, 1 = mostly people can be trusted, 2 = need of careful behaviour
6	Social class (subjective)	1 = high class, 2, 3 = upper and lower middle classes, 4 = working class, 5 = poor class
7	Scales of incomes	1 = lower step, 2 = second step, ……………, 5 = upper step

In our analysis the eigenvalues of happiness that based on life satisfaction show that the 1st PC (principal component) accounts for 47.9% of the total variation, second PC accounts for 24.9% and third PC accounts for 17.2% and other remaining PC's explain negligible variations. Therefore, on the basis of highest variations explain by 1st PC, we use 1st component for the construction of life satisfaction index as follow;

$$LSI^{†††} = 0.2993X1 + 0.3051X2 + 0.3672X3 - 0.1482X4 + 0.1764X5$$

The weights attached with variables of life satisfaction are normalized and their sum is equal to unity. The X's are the variables of happiness that depends upon overall life satisfaction as discussed in table 8. The question related to justifications of social evils and to what extent the acts like suicide, cheating on taxes, euthanasia, divorce, and abortion are justifiable. The purpose of this happiness index is to explain the behaviour of individual from that they are getting happiness either by harming themselves or society too. So sometimes happiness depends upon; those acts which are socially and/or morally prohibited.

Table No. 9 Social Evils

Sr#	Questions	Responses
1	Claiming government benefits are justifiable	1= never permissible, 2= slightly justified,…….,10 = always justifiable
2	Avoiding a fare on public transport is justifiable	
3,4	Cheating on taxes and accepting a bribe is justifiable	
5… 10	Justifiable: homosexuality, prostitution, abortion, divorce, euthanasia, suicide	1= never justifiable, 2 = slightly justified,…….,10 = always justifiable

The eigenvalues of happiness that gain form social evil justifications show that the 1st PC (principal component) accounts for 52% of the total variation, second PC accounts for 26.9% and third PC accounts for 6.8% and other remaining PC's explain negligible variations. Therefore, on the basis of highest variations explain by 1st PC, we use 1st component for the construction of social evil happiness index as follow;

$$SEI^{‡‡‡} = 0.182X1 + 0.2318X2 + 0.2281X3 + 0.1623X4 + 0.2531X5 + 0.2963X6$$
$$+ 0.2881X7 + 0.24X8 + 0.2916X9 + 0.3202X1$$

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††† Life satisfaction index
‡‡‡ Social evil index

The weights attached with variables of social evil happiness are normalized and their sum is equal to unity. The X's are the variables of happiness that depends upon social evil justification as discussed in table 9. According to Table 1.10, the happiness which based on free choices includes three variables: how much leisure is important in one's life, what would be the first choice of an unemployed person for a job and what would be second choice of an unemployed person for a job. In simple words, the trade-off between work and leisure should be on a balanced path. None of these affect negatively.

Table No. 10 Freedom of Choice

Sr#	Questions	Responses
1	How much leisure is important in one's life	1 = very important, 2 = rather important, 3 = not very important, 4 = not at all important
2	What is the first choice of unemployed person for a job	1= handsome salary, 2 = job security, 3 = favorable work environment, 4 = doing something special, 5 = welfare of community
3	What is the second choice of unemployed person for a job	

Our choice index also considered the other two questions about the job preferences. The responses of choice index are based on those things which are most important while searching a job or having it. Either people prioritized income or leisure. They are more concerned about their personal likes/dislikes or much passionate for their work. The eigenvalues of freedom of choice happiness show that the 1st PC (principal component) accounts for 48% of the total variation, second PC accounts for 32% and third PC accounts for 20%. Therefore, on the basis of highest variations explain by 1st PC, we use 1st component for the construction of freedom of choice happiness index as follow;

$$FCI^{§§§} = 0.01339X1 + 0.4926X2 + 0.4939X3$$

The weights attached with variables of freedom of choice happiness are normalized and their sum is equal to unity. The X's are the variables of happiness that relate to freedom of choice as discussed in table 1.10.

CONCLUSION

We have included various socioeconomic, demographic, religion, gender related and cultural questions regarding happiness/ life satisfaction to capture the true picture of one's level of happiness in a wider sense. These multidimensional questions make a web in which each thread is meaningful while constructing happiness index. There are always socioeconomic differences among the individuals, and everyone experiences different resources of endowments. So, they always have different opportunities during their life spans. The way they are getting benefits from these resources by availing the opportunities are also different. While constructing happiness index, political and patriotic questions could not be ignored. There are many groups and subgroups in a population to generate their classification and categorization. These groups may exhibit differential living standards and cultural and/or ethnic values. The practices that prevail among certain ethnic groups may influence the life satisfaction of not only this group but also of other subgroups.

Summarizing all the discussion, happiness is not considered as one time phenomenon which can be affected by a single arrow's direction. Happiness is a vast construct with various aspects and numerous dimensions. One might be happy with his financial status but other may not and one could be happier with his social and political status and other don't take it seriously. So, happiness based on number of things that can affect human life whether directly or indirect and these vary from individual to individual. That's why to achieve happiness—a nation must move up a ladder. Each step of the ladder consists of a set of variables. Each step has its own importance and has many dimensions as discussed above. To neglect any one of these may take away individuals as well as nations from their basic goal of achieving happiness.

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§§§ Freedom of choice index

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